Dimension

ES-1124

Unmanaged 24-port Ethernet Switch with 4 Gigabit Ports

User's Guide

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Version 1.00

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[1] "+" is the (prefix) number you enter to make an international telephone call.

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Preface

Congratulations on your purchase of the Dimension ES-1124 Ethernet Switch.

About the Dimension ES-1124 Ethernet Switch

The Dimension ES-1124 switch is a cost effective Fast Ethernet multi-port switch ideal for setting up high performance switched workgroup networks.

The ES-1124 comes with 24TX ports and four Gigabit ports: two Gigabit copper and two mini GBIC.

General Syntax Conventions

For brevity's sake, we will use "e.g." as shorthand for "for instance", and "i.e." as shorthand for "that is" or "in other words" throughout this manual.

The Dimension ES-1124 Ethernet Switch will be referred to as ES-1124 or the switch in this manual.

Unless specified, images of the ES-1124 are used throughout this document.

Related Documentation

ZyXEL Web Site

The ZyXEL download library at www.zyxel.com contains additional support documentation as well as an online glossary of networking terms.

User Guide Feedback

Help us help you! E-mail all User Guide-related comments, questions or suggestions for improvement to techwriters@zyxel.com.tw or send regular mail to The Technical Writing Team, ZyXEL Communications Corp., 6 Innovation Road II, Science-Based Industrial Park, Hsinchu, 300, Taiwan. Thank you!

Chapter 1
Getting to Know Your Switch

This chapter describes the key features, benefits and applications of your switch.

1.1 Introduction

The ES-1124 is a multi-port switch that can be used to build high-performance switched workgroup networks. This switch is a store-and-forward device that offers low latency for high-speed networking. The switch is targeted at workgroup, department or backbone computing environments for SME (small, medium enterprise) businesses.

Figure 1-1 The ES-1124

The ES-1124 features a “store-and-forward “ switching scheme. This allows the switch to auto-learn and store source address in an 8K-entry MAC address table.

All ports are auto-crossover, that is auto-MDIX ports (Media Dependent Interface Crossover), so you may use either a straight through Ethernet cable or crossover Ethernet cable for all Ethernet port connections. Auto-crossover ports automatically sense whether they need to function as crossover or straight ports, so crossover cables can connect both computers and switches/hubs.

The ES-1124 has 24 auto-crossover 10/100Base-TX RJ-45 ports and 2 auto-detect gigabit ports for higher connection speed.

1.2 Features

- Conforms to IEEE802.3 10Base-T, IEEE802.3u 100Base-TX, IEEE802.3ab 1000Base-T, IEEE802.3z Gigabit fiber standards.
- Auto-negotiating 10/100Mbps Ethernet RJ-45 ports.
- Automatic MDI/MDIX supported.
- High switch fabric up to 8.8Gbps.
- N-way Auto-negotiation supported.
- Store-and-forwarding switching architecture for abnormal packet filtering.
- Embedded 8K MAC address table providing 8000 MAC addresses entries.
- 2.5Mbits memory buffer.
- 3.3V MINI GBIC port for Gigabit fiber transceiver.
- Two Gigabit copper ports.
- IEEE 802.1p supports two priority queues for outgoing traffic. Improves network efficiency and performance.
- Back-Pressure-Base flow control on Half-duplex ports.
- Pause-Frame-Base flow control on Full-duplex ports.
- Supports automatic address learning.
- No-Blocking full wire speed architecture
- Fan free design
- Power, LNK/ACT and FDX/COL LEDs.
- Standard 19-inch rack-mount design.

1.3 Package Contents

Compare the contents of your ES-1124 Ethernet Switch package with the checklist below. If any item is missing or damaged, please contact your local dealer.

- ES-1124 Ethernet switch
- Power cord
- Quickstart Guide
- This User's Guide in CD-ROM format.
- Four rubber feet
- Rack mount brackets

1.4 Ethernet Switching Technology

Ethernet Switching Technology has dramatically boosted the total bandwidth of a network, eliminated congestion problems inherent with CSMA/CD (Carrier Sense multiple access with Collision Detection) protocol, and greatly reduced unnecessary transmissions.

This revolutionized networking in a number of ways:

- By allowing two-way, simultaneous transmissions over the same port (Full-duplex), which essentially doubled the bandwidth.
- Reducing the collision domain to a single switch-port, which eliminated the need for carrier sensing.
- Using the store-and-forward technology's approach of inspecting each packet to intercept corrupt or redundant data, switching eliminated unnecessary transmission that slowed the network.
- By employing address learning, which replaced the inefficient receiving port.

Auto-negotiation regulates the speed and duplex of each port, based on the capability of both devices. Flow-control allows transmission from a 100Mbps node to a 10Mbps node without loss of data. Auto-negotiation and flow-control may require disablement for some networking operations involves legacy equipment. Disabling the auto-negotiation is accomplished by fixing the speed or duplex of a port.

Ethernet Switching Technology supplied higher performance at costs lower than other solutions. Wider bandwidth, no congestion, and the reduction in traffic is why switching is replacing expensive routers and inefficient hubs as the ultimate networking solution.

1.5 Applications

This section provides two network topology examples in which the switch is used. By using the uplink port, the switch can connect with another switch or hub to interconnect other workgroups to form a larger switched network. The distance between two switches via fiber cable can be up to 550 meters (multi-mode fiber) or 10 kilometers (single-mode fiber).

1.5.1 Standalone Workgroup

The switch can be used as a standalone switch to which, computers, servers and printer server are directly connected to form a small workgroup.

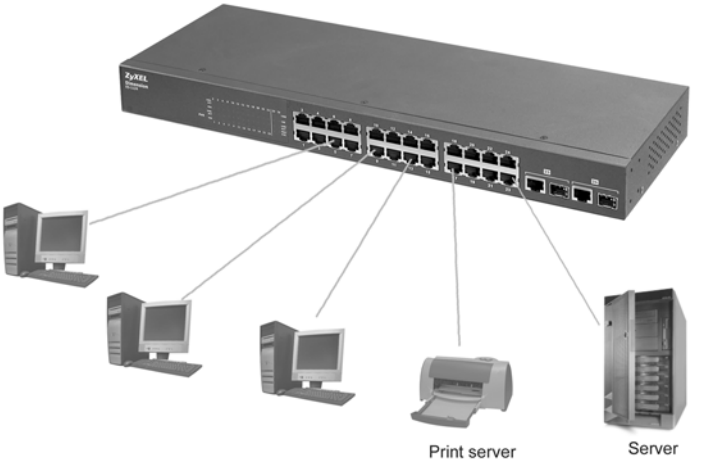

Figure 1-2 Standalone ES-1124 Workgroup Example

1.5.2 Bridging

With its large address table (8000 MAC address entries) and high performance, the switch is an ideal solution for department networks to connect to the corporate backbone or for connecting network segments.

The following figure depicts a typical segment bridge application of the switch in an enterprise environment. The two workgroups, the standalone server and the two servers can all communicate with each other and share all network resources.

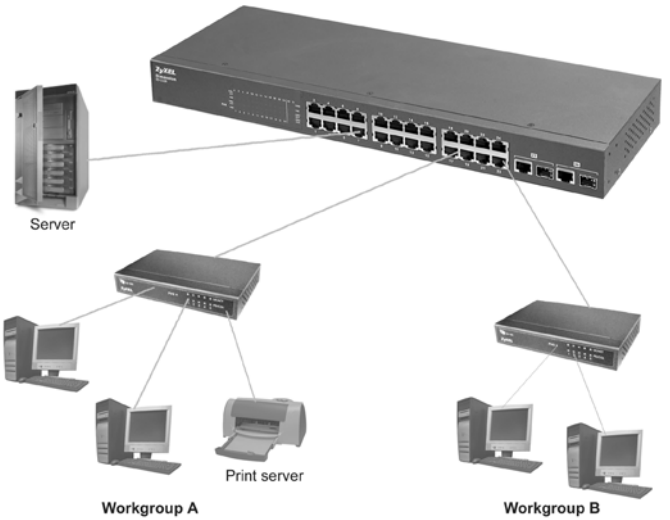

Figure 1-3 Bridging Example

Chapter 2
Hardware Description and Installation

This section shows two switch installations, describes the hardware of the switch and gives a functional overview of the switch.

The switch is suitable for an office environment where it can be rack mounted on standard EIA racks or as a standalone.

For proper ventilation, allow at least 4 inches (10 cm) of clearance at the front and 3.4 inches (8 cm) at the back of the switch. This is especially important for enclosed rack installations.

2.1 Desktop Installation

Step 1. Make sure the switch is clean and dry.

Step 2. Set the switch on a smooth, leveled and sturdy flat space strong enough to support the weight of the switch and the connected cables. Make sure there is a power outlet nearby.

Step 3. Make sure there is enough clearance around the switch to allow air circulation and the attachment of cables and the power cord.

Step 4. Remove the adhesive backing from the supplied rubber feet.

Step 5. Attach the rubber feet to each corner on the bottom of the switch. These rubber feet help protect the switch from shock or vibration and ensure space between devices when stacking.

Figure 2-1 Attaching Rubber Feet

Do not block the ventilation holes. Leave space between switches when stacking.

2.2 Rack-Mount Installation

The switch can be mounted on an EIA standard size, 19-inch rack or in a wiring closet with other equipment. Follow the steps below to mount your switch on a standard EIA rack using the included rack-mounting kit.

Step 1. Align one bracket with the holes on one side of the switch and secure it with the bracket screws that are smaller than the rack-mounting screws. Similarly, attach the other brackets.

Figure 2-2 Attaching Mounting Brackets and Screws

Step 2. After attaching both mounting brackets, position the switch in the rack by lining up the holes in the brackets with the appropriate holes on the rack. Secure the switch to the rack with the rack-mounting screws.

Figure 2-3 Mounting the ES to an EIA standard 19-inch rack

2.3 Rear Panel

The three-pronged power receptacle is located on the rear panel of the switch. Refer to the *Product Specifications* for power specification.

Figure 2-4 Rear Panel of the ES-1124

2.4 Rear Panel Power Connection

Connect one end of the supplied power cord to the power receptacle on the back of the switch and the other end to the appropriate power source.

2.5 Front Panel

The front panel of the ES-1124 consists of 24 auto-crossover 10/100Base-TX RJ-45 ports and two auto-detecting Gigabit uplink ports, which may be a Copper Gigabit port or a Mini Gigabit Fiber module (optional). The LEDs are also located on the front panel of the switch.

Figure 2-5 The Front Panel of the ES-1124

2.5.1 10Base-T/100Base-TX RJ-45 auto-negotiating ports

Your switch comes with 24 crossover 10Base-T/100Base-TX RJ-45 ports. The auto-negotiation feature allows the switch to detect the speed of incoming transmission and adjust appropriately without manual intervention. It allows data transfers of either 10 Mbps or 100 Mbps in full-duplex mode.

2.5.2 Auto-crossover MDI/MDIX ports

RJ-45 Ports (Auto MDI/MDIX): 24 auto-crossover 10/100 10Base-T or 100Base-TX connections.

All ports are auto-crossover, that is, auto-MDIX ports (Media Dependent Interface Crossover), so you may use either a straight through Ethernet cable or crossover Ethernet cable for all Ethernet port connections. Auto-crossover ports automatically sense whether they need to function as crossover or straight ports, so crossover cables can connect both computers and switches/hubs.

2.5.3 Gigabit uplink ports

Two Gigabit uplink ports: two auto detecting Giga uplink ports — UTP (unshielded twisted pair) or Gigabit fiber.

Note that when you connect the Mini GBIC to the switch, you must disconnect the Giga copper connection if you have connected it to the device. Otherwise, the switch will not detect the Mini GBIC. While you using Giga copper port or Mini GBIC port, only one of them will work, for example, when a Giga copper port is connected, the Mini GBIC will be disabled.

2.5.4 Front Panel Connections

You can use unshielded twisted pair (UTP) or shielded twisted-pair (STP) Ethernet cables for RJ-45 ports. The following table describes the types of network cable used for the different connection speeds.

Make sure the cable length between connections does not exceed 100 meters (328 feet).

Table 2-1 Network Cable Types

SPEED	NETWORK CABLE TYPE
10 Base-T	100Ω 2-pair UTP/STP Category 3, 4 or 5
100 Base-TX	100Ω 2-pair UTP/STP Category 5
1000 BASE-T	100Ω UTP/STP Category 5

2.5.5 Front Panel LEDs

The LED Indicators give real-time information about the status of the switch. The following table provides descriptions of the LEDs.

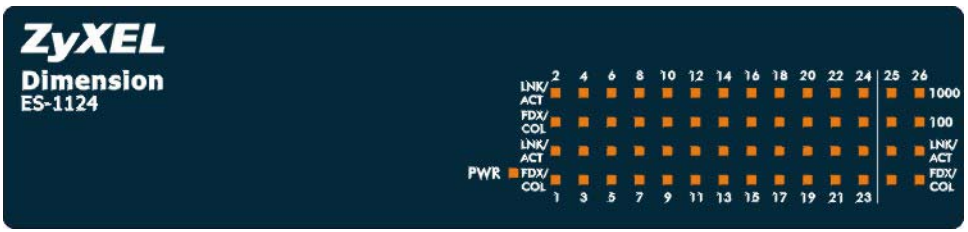

Figure 2-6 The Front Panel LEDs of the ES-1124

The following table describes the LEDs on the ES-1124 front panel.

Table 2-2 The Front Panel LED Descriptions

SYSTEM LED			
LED	COLOR	STATUS	DESCRIPTION

PWR	**Green**	**On**	**The switch is on and receiving power.**
		Off	**The switch is not receiving power.**
RJ-45 Ports 1 ~ 24			
LED	**COLOR**	**STATUS**	**DESCRIPTION**
LNK/ACT	**Green**	**On**	**The port is connected to an Ethernet network.**
		Off	**The port is not connected to an Ethernet network.**
		Blinking	**The port is receiving or transmitting data.**
FDX/COL	**Orange**	**On**	**The port is operating in full-duplex mode.**
		Off	**The port is operating in half-duplex mode.**
Gigabit Uplink Ports 25 ~ 26			
LED	**COLOR**	**STATUS**	**DESCRIPTION**
1000	**Green**	**On**	**Connection speed is 1000Mbps** **The link to a 1000Mbps Ethernet network is up.**
100	**Orange**	**On**	**Connection speed is 100Mbps** **The link to a 100Mbps Ethernet network is up.**
LNK/ACT	**Green**	**On**	**The port is connected to an Ethernet network.**
		Off	**The port is not connected to an Ethernet network.**
		Blinking	**The port is receiving or transmitting data.**
FDX/COL	**Orange**	**On**	**The port is operating in full-duplex mode.**
		Blinking	**Packet collision occurred on this port.**
		Off	**The port is operating in half-duplex mode.**

Chapter 3
Troubleshooting

This section describes common problems you may encounter with the switch and possible solutions.

3.1 Introduction

Troubleshoot the switch using the LEDs to detect problems.

3.1.1 PWR LED

The PWR LED on the front panel does not light up.

Table 3-1 Troubleshooting Power LED

STEP	CORRECTIVE ACTION
1	Check the connections from your switch to the power source. Make sure you are using the supplied power cord and that you are using an appropriate power source. Refer to the *Product Specifications* appendix.
2	Make sure the power source is turned on and that the switch is receiving sufficient power.
3	If these steps fail to correct the problem, contact your local distributor for assistance.

3.1.2 FDX LED

The FDX LED on the front panel does not light up.

Table 3-2 Troubleshooting FDX LED

STEP	CORRECTIVE ACTION
1	The port is operating in half-duplex mode and not full-duplex mode.
2	Make sure the power source is turned on and that the switch is receiving sufficient power.
3	If these steps fail to correct the problem, contact your local distributor for assistance.

3.1.3 LNK/ACT LED

The LNK/ACT LED does not light up when a device is connected.

Table 3-3 Troubleshooting LNK/ACT LED

STEP	CORRECTIVE ACTION

1	Verify that the attached device(s) is turned on and properly connected to your switch.
2	Make sure the Network Interface Cards (NICs) are working on the attached devices.
3	Verify that proper network cable type is used and its length does not exceed 100 meters. For more information on network cable types, see the *Front Panel Connections* section.

3.1.4 FDX/COL LED

The FDX/COL LED blinks.

Table 3-4 Troubleshooting FDX/COL LED

STEP	CORRECTIVE ACTION
1	Some collisions in the network are normal. If the FDX/COL (Giga) LED blinks continuously, proceed to the steps below.
2	Verify that proper network cable type is used and its length does not exceed 100 meters. For more information on network cable types, see the *Front Panel Connections* section.
3	Your network is busy. Try sending large files later, reduce the number of users or segment your network.

3.2 Improper Network Cabling and Topology

Improper network cabling or topology setup is a common cause of poor network performance or network failure.

Table 3-5 Troubleshooting Improper Network Cabling and Topology

DESCRIPTION	PROBLEMS AND CORRECTIVE ACTION
Faulty cables	Using faulty network cables may affect data rates and have an impact on your network performance. Replace with new standard network cables.
Non-standard network cables	Non-standard cables may increase the number of network collisions and cause other network problems that affect your network performance. Refer to the *Front Panel Connections* section for more information on network cable types.
Cabling Length	If you use longer cables than are needed, transmission quality may be affected. The network cables should not be longer than the limit of 100 meters.
Too many hubs between the computers in the network	Too many hubs (or repeaters) between the connected computers in the network may increase the number of network collision or other network problems. Remove unnecessary hubs from the network.

Table 3-5 Troubleshooting Improper Network Cabling and Topology

DESCRIPTION	PROBLEMS AND CORRECTIVE ACTION
A loop in the data path	A data path loop forms when there is more than one path or route between two networked computers. This results in broadcast storms that will severely affect your network performance. Make sure there are no loops in your network topology.

Product Specifications

This section provides the specifications of the switch.

PRODUCT SPECIFICATIONS	
General	
Standards	IEEE802.3 10BASE-T Ethernet (twisted-pair copper) IEEE802.3u 100BASE-TX Fast Ethernet (twisted-pair copper) IEEE802.3ab 1000BASE-T IEEE802.3z Gigabit fiber ANSI/IEEE802.3 Auto-negotiation IEEE802.3x Flow Control
Uplink Interface	2 1000Base-T RJ-45 connectors 2 mini-GBIC ports (shared with 1000Base-T)
Interface	24 10/100M Ethernet Ports Auto-crossover Compliant with IEEE 802.3/3u Back pressure flow control for half duplex Flow control for full duplex (IEEE 802.3x) Connector: RJ-45
Data Transfer Rate	Ethernet: 10Mbps(half duplex) 20Mbps (full duplex) Fast Ethernet: 100Mbps (half duplex) 200Mbps(full duplex)
Network Cables	10BASE-T: UTP Cat.3, 4, 5 (100 m) EIA/TIA-586 100-ohm STP (100 m) 100BASE-TX: UTP Cat.5 (100 m max.) EIA/TIA-568 100-ohm STP (100 m max.) 1000BASE-TX: UTP Cat.5 (100 m max.) EIA/TIA-568 100-ohm STP (100 m max.)
Full/Half Duplex	Full/Half duplex for 10/100Mbps speeds
Media Interface Exchange	All ports support auto-crossover
Performance and Management	
Back plane	Non-Blocking full wire speed forwarding rate 8.8Gbps
Packet Forwarding Rate	14880PPS for 10BASE-T 148800PPS for 100BASE-TX
Switching Method	Store-and-forward
MAC Address Table	8K Mac with Auto Learning

PRODUCT SPECIFICATIONS	
Data Buffer	2.5Mbits
Physical and Environmental	
Weight	2Kg
LED and Switch Per unit: Per 10/100 Mbps Ethernet Port: Per GBIC Port: Per 1000Base-T Ethernet Port:	 PWR (green): Light on or off: Power on or off LNK/ACT, FDX/COL LNK/ACT, FDX/COL LNK/ACT, FDX/COL
Layer 2 features	Bridging: 8K MAC addresses Switching: Switching fabric: 8.8Gbps IEEE 802.1p Frame size: 1522 bytes Broadcast storm control
Connector	10/100TX: RJ-45 1000T: RJ-45 MINI GBIC Socket: support 3.3V DC power for MINI GBIC transceiver
Dimensions	19” rack mountable enclosure 440(L) x 161(W) x 44(H) mm
Power Supply	100 – 240VAC 50/60Hz internal universal power supply
Power Consumption	19.8W max.
Operating Temperature	0℃ ~ 45℃ (32ºF to 113ºF)
Operational Humidity	10% to 90% (Non-condensing)
EMI	FCC Class A, CE
Safety	UL, cUL

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